artisan (discussed in (i) below), or (2) be limited by the language in the claim to a practical application within the technological arts (discussed in (ii) below)." Applicant submits that these claims fall in the latter category.

Independent claim 1, is directed to a computer-implemented method "for use in creating a digital model of an individual component of a patient's dentition." Independent claim 75, is directed to a computer-implemented method "for use in creating a digital model of a tooth in a patient's dentition." Independent claim 98, is directed to a computer-implemented method for "for use in creating a digital model of a tooth in a patient's dentition."

Because independent claims 1, 75 and 98 are limited by the language in the claim to a practical application within the technological arts, Applicant respectfully submits that claims 1, 75 and 98 are statutory. Claims 2-74, 76-97 and 99-120 depend either directly or indirectly from claims 1, 75 and 98, and so are statutory for at least the reasons given above.

For at least these reasons, Applicant respectfully requests that the rejection of claims 1-4, 7-10 and 15-192 under 35 U.S.C. § 101 be reconsidered and withdrawn.

Rejection under 35 U.S.C. § 102

Claims 1, 8, 9, 15-17, 121, 122, 170 and 171 were rejected under 35 U.S.C. § 102(b) as unpatentable over U.S. Patent No. 5,338,198 (Wu). Applicant respectfully requests reconsideration and withdrawal of the rejection.

Wu appears to disclose a dental modeling simulator. However, Wu does not disclose at least one element of Applicant's invention as claimed in each of independent claims 1, 121 and 170. Regarding claim 1, Wu fails to disclose "applying a computer-implemented test to the data set to identify data elements that represent portions of an individual component of the patient's dentition." Regarding claim 121, Wu fails to disclose "apply a test to the data set to identify data elements that represent portions of an individual component of the patient's dentition." Regarding claim 170, Wu fails to disclose "apply a test to identify data elements lying on a gingival boundary that occurs where the tooth and the gum tissue meet."

At page 2 of the Office Action, the Examiner relies on a single sentence in Wu at col. 7, lines 7-10 to teach these elements. Referring to an unspecified "customized solid modeling graphic software package," (col. 7, lines 1-2) that sentence states "[t]he software also allows for

subsequent customized model segmentation: this facilitates the simulation of any component tooth movement determined by operator input, including extraction." While this sentence appears to indicate that such a software package allows segmentation of a model, it is insufficient to teach Applicant's claimed "computer-implemented test" (claim 1) or "computer program . . . including instructions that cause the computer to . . . apply a test" (claims 121 and 170) "to identify data elements" (claims 1, 121 and 170). The most that Wu appears to suggest is that a user could use a software package to manually segment a model. In contrast, Applicant claims an automatic process for segmenting a model.

Claims 8, 9, 15-17, 122 and 171 depend, directly or indirectly, from independent claims 1, 121 and 170.

For at least these reasons, Applicant respectfully requests that the rejection of claims 1, 8, 9, 15-17, 121, 122, 170 and 171 under 35 U.S.C. § 102(b) be reconsidered and withdrawn.

Rejections under 35 U.S.C. § 103

Claims 2, 3 and 5 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wu in view of U.S. Patent No. 5,725,376 (Poirer). Applicant respectfully requests reconsideration and withdrawal of the rejection.

Poirer appears to be directed to methods for manufacturing a dental implant drill guide and a dental implant superstructure. However, Poirer fails to remedy the defects of Wu recited above regarding the rejection of claim 1. Because claims 2, 3 and 5 depend from claim 1, Applicant respectfully requests that the rejection of claims 2, 3 and 5 be reconsidered and withdrawn for at least the reasons given above regarding claim 1.

Claim 4 was rejected under 35 U.S.C. § 103(a) as unpatentable over Wu in view of U.S. Patent No. 5,800,174 (Andersson). Applicant respectfully requests reconsideration and withdrawal of the rejection.

Andersson appears to be directed to a method using an articulator and computer to represent an individual's bite. However, Andersson fails to remedy the defects of Wu recited above regarding the rejection of claim 1. Because claim 4 depends from claim 1, Applicant respectfully requests that the rejection of claim be reconsidered and withdrawn for at least the reasons given above regarding claim 1.

Claim 6 was rejected under 35 U.S.C. § 103(a) as unpatentable over Wu in view of U.S. Patent No. 4,837,732 (Brandestini). Applicant respectfully requests reconsideration and withdrawal of the rejection.

Brandestini appears to be directed to a method and apparatus for the three-dimensional registration and display of prepared teeth. However, Brandestini fails to remedy the defects of Wu recited above regarding the rejection of claim 1. Because claim 6 depends from claim 1, Applicant respectfully requests that the rejection of claim be reconsidered and withdrawn for at least the reasons given above regarding claim 1.

Claims 7, 19-74, 124-146 and 173-192 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wu. Applicant respectfully requests reconsideration and withdrawal of the rejection.

The Examiner asserts that "[t]he specific segmentation used is an obvious matter of choice in the desired site to be treated by the skilled artisan. The specific mathematical algorithm used to find the desired portion is an obvious matter of choice in known algorithms for segmentation of data to one of ordinary skill in the art." Applicant respectfully disagrees. The Examiner's assertion appears to be premised on a conclusion that such elements are non-statutory. Applicant respectfully submits that such elements are statutory for the reasons given above regarding the rejection under 35 U.S.C. § 101.

Because each of claims 7, 19-74, 124-146 and 173-192 depends, directly or indirectly, from one of claims 1, 121, and 170 Applicant respectfully requests that the rejection of claims 7, 19-74, 124-146 and 173-192 be reconsidered and withdrawn for at least the reasons given above regarding claims 1, 121, and 170.

Claims 10, 18 and 98-120 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wu in view of U.S. Patent No. 5,395,238 (Andreiko 238). Applicant respectfully requests reconsideration and withdrawal of the rejection.

Andreiko 238 appears to be directed to a method of forming orthodontic brace. However, Andreiko 238 fails to remedy the defects of Wu recited above regarding the rejection of claim 1. Because claims 10 and 18 depend from claim 1, Applicant respectfully requests that the rejection of claims 10 and 18 be reconsidered and withdrawn for at least the reasons given above regarding claim 1.

Regarding the rejection of claim 98, Applicant respectfully submits that Andreiko 238 fails to remedy the defects of Wu discussed above regarding claim 170. Applicant respectfully requests that the rejection of claim 98 be reconsidered and withdrawn for at least the reasons given above regarding claim 170.

Claims 97-120 depend, directly or indirectly, from independent claim 98.

For at least these reasons, Applicant respectfully requests that the rejection of claims 10, 18 and 98-120 under 35 U.S.C. § 103 be reconsidered and withdrawn.

Claims 11-14, 75-97, 123, 147-169 and 172 were rejected under 35 U.S.C. § 103(a) as unpatentable over Wu in view of U.S. Patent No. 5,683,243 (Andreiko 243). Applicant respectfully requests reconsideration and withdrawal of the rejection.

Andreiko 243 appears to be directed to a custom orthodontic appliance forming apparatus. However, Andreiko 243 fails to disclose at least one element of each of independent claims 75 and 147: applying a computer-implemented test "to identify data elements that represent an interproximal margin between two teeth in the dentition." The Examiner asserts that "Andreiko (243) teaches extracting the spacing between teeth." Applicant respectfully disagrees. Instead, Andreiko 243 appears to teach *receiving the inter-tooth spacing as an input* to the process.

> In step (300) *information is input* for use, in part, to define from the patient's lower jaw bone the shape of the mandibular trough MT, which serves as the first constraint in arriving at the finish position of the teeth. In one embodiment, this is accomplished by superimposing a predefined grid G on a video or graphics image of the mandibular trough (from FIG. 3) in the manner illustrated in FIG. 4. In addition, the *distances between* the mesiodistal extremities, or mesiodistal widths MDW, that is, their *contact points with adjacent teeth*, in a horizontal plane, *are input*. These determine the total length of the dental arch and the relative center-to-center spacings of the teeth along the arch.

Col. 22, line 44-56 (emphasis added). Thus Andreiko 243 appears to teach receiving spacing data as an input, rather than extracting such data.

The Examiner asserts that certain elements of claims 11-14, 75-97, 123, 147-169 and 172 are obvious matters of choice. Applicant respectfully disagrees. The Examiner's assertion appears to be premised on a conclusion that these elements are non-statutory. Applicant

respectfully submits that these elements are statutory for the reasons given above regarding the rejection under 35 U.S.C. § 101.

Claims 11-14, 76-97, 148-169 and 172 depend, directly or indirectly, from independent claims 1, 75, 147 and 170, respectively.

For at least these reasons, Applicant respectfully requests that the rejection of claims 11-14, 75-97, 123, 147-169 and 172 under 35 U.S.C. § 103 be reconsidered and withdrawn.

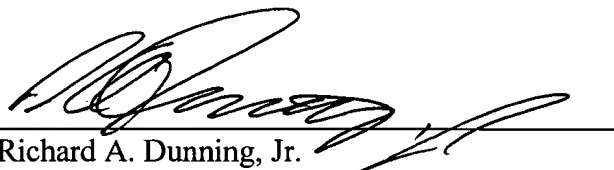### *Rejection for Double Patenting*

Claims 1-102 were provisionally rejected under the doctrine of obviousness-type double patenting as being unpatentable over claims 10-12, 30-43, 53, 58, 60, 67, 68, 73-76, 80 and 81 of copending application number 09/169,276. Applicant will file a Terminal Disclaimer in due course.

Applicant submits that all of the claims are now in condition for allowance, which action is requested. Filed herewith is a check in payment of the excess claims fees required by the above amendments and Petition for Automatic Extension with the required fee. Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date: 8/21/00

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